



CASE STUDY

HiTemp Scanner Technology Optimizes Reliability and Safety

The Problem

In today's power industry some of the major problems with flame detection equipment are reliability, discrimination and high ambient temperatures that affect the operation of the equipment. With the utility industry drastically changing to meet the needs for deregulation, emission requirements and NFPA requirements; advanced technology in controls and monitoring equipment will become a top priority in the power industry. These concerns with flame detection exist on front fired, corner fired, recovery boilers and incinerators. The safe operation of fossil-fuel-fired boilers is dependent to a large extent on the stability of the combustion process. Flame instability can be both inefficient and pollutant forming, but in extreme cases flame extinction can occur. Unless immediate action is taken in such circumstances, large quantities of unburned fuel can be admitted to the combustion chamber and subsequently re-ignite explosively with serious consequences to both personnel and equipment. Also, the close proximity of the burners to each other present a special flame scanning challenge in discriminating from adjacent burner flames with different fuels and various firing rates. Oil refineries, petrochemical plants, LPG plants, offshore platforms and chemical plants all utilize or produce a wide range of hazardous gases including combustible gases and toxic gases, which creates additional problems in flame detection. In either case, high ambient temperatures are the leading cause in flame detection equipment failure. The high temperatures can result from an un-insulated boiler, hot air duct near the burners or ambient air temperature. The life expectancy of electronic components used in the equipment degrades considerably with higher temperatures. There are methods used to aid in protecting the equipment, but are usually an expensive alternative.

The Solution

Flame detectors are designed to detect either ultraviolet (UV) or infrared (IR) radiation emitted by a flame. These types of detectors can detect natural gas, oil or coal flames which may not be visible to the naked eye. The key to safe combustion operation is the ability to detect the presence and absence of a flame as quickly and reliably as possible. Some simple rules to follow would be to verify all grounding to the flame detection equipment is proper, gain and intensity selections in the amplifiers are not at the maximum settings.

Also verify the proper amount of cooling air is provided to each scanner. Safe-Fire's IR and UV scanners are rated for high temperatures (212°F) and best suited for detecting natural gas, oil or coal flames. The IR scanner contains a photodiode infrared sensor used to detect coal and/or oil flames where high discrimination is required. The UV scanner contains an ultraviolet sensor used to detect natural gas flames. Both scanners can continuously detect flicker frequency and amplitude characteristics of target flames. Safe-Fire has the technology and experience to protect boilers around the world.

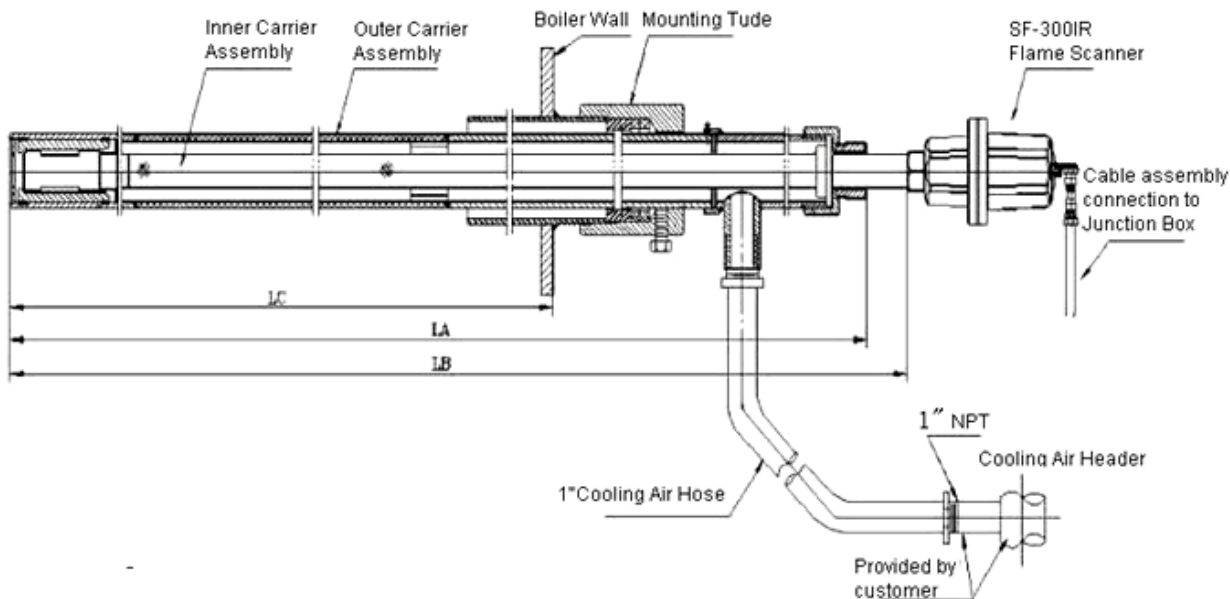


Features

- Die-cast aluminum shell
- High temperature resistance
- High quality components

Applications

- Burners firing pulverized coal, oil or gas
- Hostile environments
- Recovery boilers or incinerators
- Gas and oil fired turbine generator



The Results

Installing advanced flame detection equipment allow boilers to operate more reliably and are less prone to accidental shutdowns due to weak flame perception. The costs associated with both false-positive and false-negative indications from a flame detector can be significant, far exceeding the cost of the scanners, including the installation. False-negative, while creating a “fail safe” condition, means the turbine is tripped, which now requires a restart. A number of starts are directly related to the expected life of the turbine, causing premature replacement costs of very expensive components. In addition, tripping the unit introduces process interruptions which can otherwise be very costly. The potentially ensuing events do not require further elaboration other than to say they can be enormously expensive and possibly even tragic. The cost savings per year from installing advanced flame detection equipment on a boiler is significant for boiler performance and safety. The savings range could vary between \$75,000 to \$300,000 dollars per year. With any flame detection equipment it must be applied correctly in order to receive the maximum benefits.

BENEFITS

- Improves boiler performance and reliability
- Reduces boiler downtime
- Boiler safety improved
- Increase in production
- Lower maintenance